

# NASA SBIR/STTR Technologies

## S1.02-9012 - Scalable Architectures for Distributed Beam-Forming Synthetic Aperture Radar (DBSAR)



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### Identification and Significance of Innovation

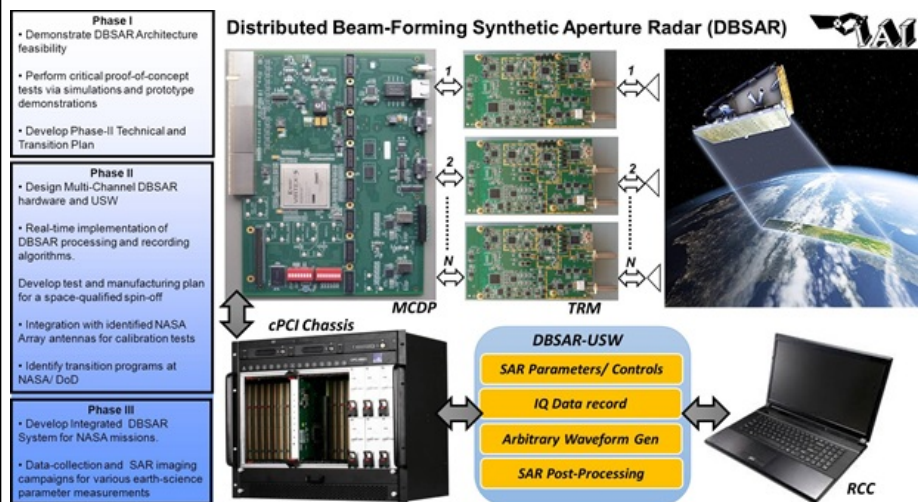
Conventional SAR operates in the Stripmap mode. Wide unambiguous swath coverage and high azimuth resolution pose contradictory requirements on the design of SAR systems. A promising technique to overcome this limitation is Digital Beam-Forming (DBF) on receive where the receiving antenna is split into multiple sub-apertures. This provides the capability of forming multiple beams via post-processing. DBF techniques applied to SAR systems can increase receiving antenna gain without a reduction of the imaged area and suppress interference signals. A highly capable DBSAR instrument design would consist of wideband Transmitter-Receiver Module (TRM), precise multi-channel timing and synchronization and reconfigurable processing engine that can host the SAR processing, calibration and control routines. IAI's proposed approach is modular, scalable and meets the NASA goals of developing an innovative analog/digital hardware design for the implementation of distributed DBSAR architectures.

Estimated TRL at beginning and end of contract: ( Begin: 3 End: 4 )

### Technical Objectives and Work Plan

The Phase-I technical objectives are:

- Objective 1: Prove the feasibility and applicability of the DBSAR system design for NASA Missions
- Objective 2: Demonstrate a path to scalable, multi-channel SAR with a path towards space-borne applications
- Objective 3: Develop transition plan for Phase-II design, system validation and commercialization



### NASA Applications

DBSAR be used for a wide range of remote sensing applications for NASA including:

- Reconfigurable radar systems for UAVs, manned aircrafts and spacecraft
- Tomographic Radar for Biomass and Ice-sheet imaging.
- Algorithm development platform for existing NASA radar platforms

- Objective 3: Develop transition plan for Phase-II design, system validation and commercialization

### Non-NASA Applications

The most promising commercial applications of DBSAR, besides NASA applications are:

- Real-time digital processors
- Multi-channel arbitrary waveform generator/ recorder
- Direction direction-finding

### Firm Contacts

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NON-PROPRIETARY DATA